

## Dugongs of Ashmore Reef and the Sahul Banks: a review of current knowledge and a distribution of sightings

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### ABSTRACT

A small, but significant, population of dugongs (*Dugong dugon*) occurs on Ashmore Reef. One sighting in 1996, 130 km east of Ashmore Reef, indicates that dugongs could use other shallow shoals on the Sahul Banks. Individuals representing all age classes were present on Ashmore Reef. Cow and calf pairs indicate that breeding occurs on the reef and there is at least some short-term residency. The oceanic coral reef habitat used by these dugongs is unusual when compared to the coastal habitat used by other Australian populations. Situated between Indonesia and the Australian mainland, Ashmore Reef supports a population of dugongs whose genetic identity is uncertain. The dugongs at Ashmore Reef represent one of the most isolated and least known populations in Australian waters. Future research at Ashmore Reef should be directed at determining their population size, movements, preferred habitats, genetic identity and the extent to which their requirements are met by the Ashmore Reef National Nature Reserve. A research and conservation strategy should be incorporated into the Plan of Management of the Ashmore Reef National Nature Reserve. Further research should extend to the Sahul Banks.

KEYWORDS: Dugongs, population size, Ashmore Reef, Sahul Banks, genetics, north-west Australia.

### INTRODUCTION

Dugongs are large mammalian herbivores which inhabit tropical and sub-tropical coastal waters between the east coast of Africa and Vanuatu (Nishiwaki and Marsh 1985). Internationally, they are listed as Vulnerable in the IUCN Red Data Book. In Australia, they are not listed as threatened under Australian Commonwealth Legislation, but are protected under the Environment Protection and Biodiversity Act 1999. The presence of dugongs at Ashmore Reef has been known since 1986 when it was reported by Australian National Parks staff (Whiting 1999). Ashmore Reef (12°15'S, 123°04'E) is located 340 km from the Kimberley coast of the Australian mainland and 140 km south of Roti Island Indonesia. Ashmore Reef represents unusual habitat for dugongs because of its isolation from any substantial land mass.

### PRESENCE, DISTRIBUTION AND POPULATION SIZE

In November 1996, observations from a Coastwatch surveillance aircraft confirmed anecdotal reports by Parks Australia North personnel of dugongs on Ashmore Reef (Whiting 1999). Eight dugongs were sighted within

the transect area which represented 6% (11 km<sup>2</sup>) of the reef flat (182 km<sup>2</sup>). This gives a population estimate of over 100 individuals on the reef flat at high tide. In addition, one group of three was sighted outside the transect area. Individuals representing all size classes were present, including cow and calf pairs.

In 1996, a database was established to record all dugong sightings at Ashmore Reef. Since 2000, Australian Customs Officers stationed at Ashmore Reef have recorded dugong sightings during their routine patrols. These sightings, together with other sightings by the authors, have added to the information of habitat use obtained from the initial aerial survey. Figures 1 and 2 show the positions of 25 sightings of 42 dugongs on Ashmore Reef since 1996, including the sightings from the aerial survey. Figure 1 is categorised by sighting method while Figure 2 is categorised by group size. Sightings were mostly in shallow water over both sand and reef flat. There was a concentration of sightings on the southern reef flat between Middle and East Islands. Sightings were most likely biased towards shallow water habitat where observers could see dugongs easily. All dugongs, except one, that were viewed from a boat or land were in water depths of between 1 and 3 m. One dugong was observed in water 10.5 m deep. Group size ranged between one and seven

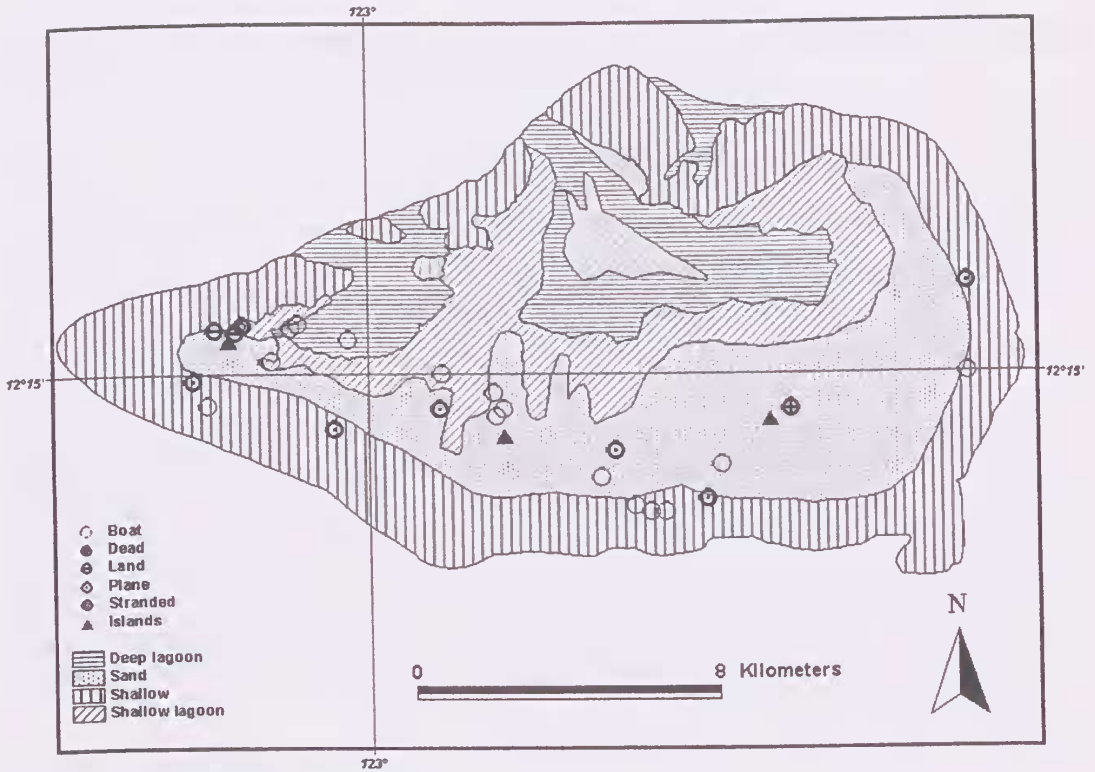


Fig. 1. Dugongs at Ashmore Reef by sighting method.

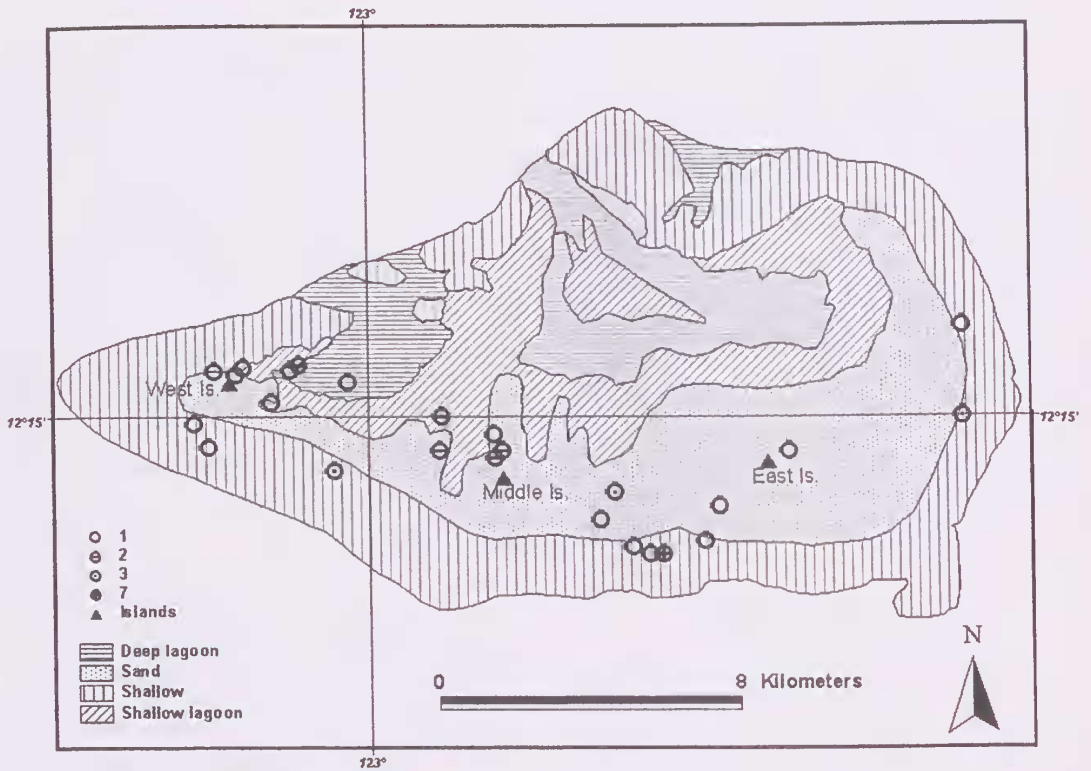


Fig. 2. The group size of dugongs sighted at Ashmore Reef.

individuals. Ten cow and calf pairs were observed. Dugongs have been observed at Ashmore Reef during most months of the year including: February, March, April, July, August, September, October and November.

Dugongs are not restricted to the Ashmore Reef Nature Reserve. In 1996, during the aerial survey flight with Coastwatch, one dugong was observed 130 km east of Ashmore Reef (Whiting 1999), which indicates that other shallow shoals on the Sahul Banks are used.

### ISOLATION

Dugongs at Ashmore Reef are geographically isolated from other known populations in the region. There are only a few populations of dugongs throughout the Indo-Pacific that occur in association with oceanic islands and reefs. A well-known site is Palau, where their small population size and isolation make them vulnerable to the unsustainable illegal harvest that continues around these islands (Marsh *et al.* 2002). Aldabra Atoll, in the western Indian Ocean, is an interesting site because dugongs were thought to be extinct in this region since the 20th century (Marsh *et al.* 2002). Confirmed sightings of dugongs around this atoll in 2001 (Chong-Seng pers. comm. in Marsh *et al.* 2002) indicate that they have the ability to travel large distances across open sea and recolonise areas. Satellite tracking studies support the ability of dugongs to move large distances but have yet to show ocean crossings to isolated atolls. In Queensland, two studies showed that dugongs moved large distances between core areas along the coast. In the first study a pubertal male moved 140 km three times in nine weeks (Marsh and Rathbun 1990), while in the second study, four dugongs made up to four trips between core areas 165 km apart (Preen 2001). In the same study, one dugong covered a distance of 860 km along the Queensland coast (Preen 2001). In Indonesia, dugongs moved between 17 and 65 km from the site of capture (Iongh *et al.* 1998). These studies show that the location of Ashmore Reef in relation to Indonesia and the Australian mainland is well within the swimming ability of dugongs. Tracking studies or detailed genetic studies would be required to determine the regularity of movement between these areas.

**Genetic identity.** Skin samples were taken from five dugongs at Ashmore Reef. Three samples have been sequenced to date. Two samples appeared similar to those from SE Asia while the third sample was similar to samples from three dugongs along the mainland of Western Australia. (B. McDonald, pers. comm.). Until further samples are taken and analysed from Ashmore Reef, the nearby island of Timor, and the Kimberley Coast of Australia, the genetic identity of the population at Ashmore Reef will remain uncertain. However, the results from samples analysed to date indicate that

Ashmore Reef may represent a mixture of individuals from different stocks in northern Australia and SE Asia.

### MANAGEMENT ISSUES

The geographic isolation of dugongs on Ashmore Reef and the Sahul Banks has afforded them protection against mesh nets and boat-strike, which are serious threats to some Australian populations (Queensland Environmental Protection Agency 1999). Probably the main threat in recent times has been the illegal hunting by Indonesian fishers themselves, which killed an unknown number of dugongs in the area. With a greater use of the Sahul Banks region by a variety of groups including Australian Customs Service, Royal Australian Navy, research groups, oil and gas industry and Indonesian fishers themselves, the future potential threats to this population of dugongs are greater. These potential threats include boat-strike and disturbance from increased boat traffic in the area, illegal hunting by Indonesian fishers, and habitat loss from pollution caused by accidents in the oil and gas exploration and extraction industry.

Boat traffic, including both large and small vessels, has increased at Ashmore in recent years. This has been due partly to increased activities by other Australian government agencies in the area that are not directly related to the National Nature Reserve. An increase in biological research in the area has also increased the use of small boats in the area during short periods. Dugongs, sea turtles and sea snakes are vulnerable to strikes by fast moving small vessels (e.g. the pursuit vessel currently used by Australian Customs Officers has a planing speed of over 32 knots). Australian Customs Officers and visiting researchers should be educated in, and practise, safe boat operating procedures while stationed at Ashmore Reef. A code of conduct should include similar conditions to those used on the Great Barrier Reef for dugong watching. Important conditions state: a vessel must not approach within 50 m while under power and within 100 m while planing, must not pursue a dugong if it has moved away from the vessel, must not separate mother and calf, and abandon all interaction if the dugong is distressed or alarmed (T. Stokes, pers. comm.). Also, larger vessels anchored in the lagoon, especially those that leave generators or auxiliary engines running, may deter dugongs from using or moving through these areas.

Illegal hunting of dugongs has occurred on Ashmore Reef in the past (Whiting 1999). However, with an Australian Customs Vessel stationed at Ashmore Reef for 12 months of the year illegal hunting is not likely.

Chemical pollution has the potential to cause habitat degradation. Possible sources of pollution include those illegal vessels that are apprehended and kept in the lagoon

and leak oil, diesel and contaminated bilge water (Commonwealth of Australia 2001). Most apprehended vessels are in a poor state of sea-worthiness and sink if unattended. Another potential source of pollution is the oil and gas industry which actively explores for and extracts oil and gas in the region. Accidents have the potential to discharge liquid and decomposable solid wastes (Commonwealth of Australia 2001). Dugongs occur outside the National Nature Reserve as indicated by the three dugongs sighted 130 km to the east of Ashmore Reef (Whiting 1999). Shallow shoals that are the likely areas used by dugongs and sea turtles are also the focus of exploratory drilling because of their link with hydrocarbon seeps (Glenn and O'Brien 2000). Noise, disturbance, activity and pollution from these wells have the potential to impact on dugongs and sea turtles if they occur in these areas. This highlights the need to better understand the ecology of dugongs in this region.

#### FUTURE OBJECTIVES

The dugong population at Ashmore Reef is one of the most isolated and least known in Australian waters. Future research at Ashmore Reef should be directed at determining population size, movements, preferred habitats, genetic stock and the extent to which their requirements are met by the Ashmore Reef National Nature Reserve. These objectives can be achieved through a combination of dedicated research expeditions and detailed observations by the Warden appointed by the Department of the Environment and Heritage or the Australian Customs Officers stationed at Ashmore Reef. Additional research should aim to determine the spatial range and habitat use of dugongs in other areas of the Sahul Banks. Research should extend into the waters of Nusa Tenggara Timur and East Timor to give a regional view of dugongs in the area. This could be achieved with joint projects with Indonesian and East Timorese Agencies.

#### CONCLUSION

The individuals found on Ashmore Reef and Sahul Banks represent an isolated and unusual population of dugongs that use an oceanic habitat compared to those that use the coastal habitat of mainland Australia. Situated between Indonesia and the Australian mainland, Ashmore Reef supports a population of dugongs whose genetic identity is unclear. Although relatively undisturbed at present, increased activity on Ashmore Reef and the development of the oil and gas industry in the region means that further research and some management of this species is required to maintain the integrity of the Reserve and reduce negative impacts.

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